SHORT COMMUNICATION

STRANDING OF A DWARF MINKE WHALE AT BANKS PENINSULA, NEW ZEALAND

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SUMMARY

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On 15 March 1987 a dwarf minke whale was found circling in shallow water in Pigeon Bay, Banks Peninsula. It grounded several times and was pushed back into deeper water and herded out of the bay. The whale's behaviour during these manoeuvres is described. Nine days later the whale restranded in Pigeon Bay and died. Postmortem observations showed that the whale was a juvenile male, heavily parasitised with *Anisakis* nematodes in the stomach, and had an abscess of long standing in one testis. We conclude that the animal's poor state of health was the primary cause of the stranding. The stranding confirms the presence of the dwarf form of minke whale in New Zealand waters.

KEYWORDS: minke whale - stranding - behaviour - abscess - parasites.

INTRODUCTION

From an analysis of underwater photographs of live individuals and from strandings, Arnold *et al.* (1987) noted the occurrence of two forms of minke whale (*Balaenoptera acutorostrata*) in Australian waters. These forms differ in size, colouration, osteology and morphology. The dwarf form, as described by Arnold *et al.* (1987), has a light rostral saddle, blowhole streaks, dark throat patch, white shoulder patch containing a dark flipper oval, grey shoulder blaze, white flipper base and a light peduncle patch. The most conspicuous feature of these whales is the white patch extending from the flipper base onto the pectoral flipper. This form reaches reproductive maturity at a smaller size than the grey-flippered form (Best 1985).

There have been 40 recorded strandings of minke whales on New Zealand coasts (M. Brabyn, pers. comm.). Photographs of 10 of these specimens are held at the National Museum (Wellington, New Zealand), and show that five of these have been of the dwarf, white-flippered form, and five have been of the grey-flippered form (A. Baker, pers. comm.). Strandings of adult minke whales are rare on New Zealand coasts. All of the recorded strandings have been of individuals smaller than 7.0 m total length (A. Baker, pers. comm.).

RESULTS

BEHAVIOURAL OBSERVATIONS

On 15 March 1987 we were informed of the presence of a whale 3.2 nautical miles (~6 km) inside Pigeon Bay (43°40.6′S; 172°53.4′E), a long, narrow harbour on the northern side of Banks Peninsula (South Island, New Zealand). At 1150 hrs we found the whale swimming in tight clockwise circles approximately 20-30 m in diameter within 50 m of the shore in water 3-5 m deep: so shallow that each beat of its tailflukes stirred up muddy water from the bottom. According to a local observer the whale had been grounded earlier that morning for about 20 minutes on a large flat rock, and had managed to free itself. Between 1224 and 1315 hrs, 63 timed dives ranged between 25-96 s in duration. Mean dive duration was 51.2 s (S.E. = 2.1).

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The weather was partly overcast, with a 5-10 knot northerly breeze. Sea-surface temperature was 17.3°C, water visibility 0.75 m (25 cm Secchi disc). Nominally, high tide was at 1617 hrs, reaching 2.0 m above chart datum (New Zealand Nautical Almanac 1987). Full moon occurred on this date.

When approached by a boat, the whale continued to swim in tight circles but shifted its circle away from the boat. A 3.9 m, outboard-powered inflatable boat was used on the inshore side of the whale's circle to shift it into deeper water. At 1630 hrs, after herding the whale approximately 800 m towards the harbour entrance, the whale's circle once again came within 50 m of the western side of the harbour. At 1645 hrs, in an attempt to move the whale further away from the side of the harbour, the boat accidentally entered the whale's circle, apparently causing the whale to startle and run aground, wedging itself between two large rocks. On stranding it thrashed violently with its tailflukes, but soon calmed, and was pushed off by three people within 20 minutes of grounding. The whale then swam about 30 m along the shore, turned right and regrounded. It was pushed off again and regrounded again, 30 m further down the shore. On the third grounding the whale had come straight in, at right angles to the shore, making it possible to push it off in a clockwise direction. This was more successful, and the whale immediately resumed swimming clockwise circles. The inflatable boat was again used to herd the whale into deeper water. At one stage during this manoeuvre the whale dived under the boat (which was between it and the shore) lifting the boat's stern out of the water and scoring its back on the skeg of the outboard motor, which was idling in neutral. We left the whale, still swimming in clockwise circles, about 100 m from the shore, at 1822 hrs.

At 0720 hrs next morning it was found still swimming in circles, in almost the same position we had left it. Seventy-seven dive times were recorded between 0726-1121 hrs. The duration of these ranged between 30-81 s with a mean of 47.4 s (S.E. = 1.2). During this period the whale was swimming in water 8.5-17 m deep. Over the next nine hours the whale was herded 2.9 nautical miles (~5.4 km) to beyond the harbour entrance.

During the following two days (17 and 18 March) the coasts of Banks Peninsula were searched by water, using the coastal strip survey technique of Dawson and Slooten (1988). The whale was not seen.

POSTMORTEM OBSERVATIONS

Nine days after the first stranding a whale was again reported in Pigeon Bay. At 0600 hrs on 24 March a local observer saw it beach itself on a rock shelf about 400 m further into the harbour than the site of the first stranding, slip back off the shelf and sink in 3 m deep water. Appproximately two hours later we found it lying on the bottom in the position he described. To facilitate examination and disposal of the carcase, the dead whale was towed to a beach on the other side of the harbour, and dragged up it by bulldozer. The whale was the same individual that stranded the week before, as it still bore the scar made by the skeg of the outboard motor.

The general colouration of the whale conformed to the description of Arnold *et al.* (1987), most closely resembling the animal they illustrated in their Fig. 2 (p.9), but there was a striking swirling pattern of white on the grey of the whale's 'flank patch' (*sensu* Arnold *et al.* 1987). The skin of the whale was pock-marked with numerous healing and fresh oval scars. Similar wounds have been attributed to predation by cookie-cutter sharks (*Isistius brasiliensis*) (Jones 1971). The groundings (there were at least five separate groundings) had caused extensive but superficial abrasions to the whale's ventral surface.

On necropsy, the stomach was found to contain no food, but was heavily infested with nematodes of the genus *Anisakis*. These were found in all three stomachs, but were particularly abundant in the second stomach. On removal these worms filled a one litre container. The boundary layer between the blubber and muscle was also heavily parasitised with several hundred larval cysts of the cestode *Phyllobothrium* sp.

Blubber thicknesses were: middorsal 4.4 cm, midlateral 4.6 cm, midventral 4.5 cm. The intestine contained only greenish-brown bile. The whale was sexually immature with no obvious sperm formation seen in histological examination. The reproductive system appeared normal except for a large, calcified abscess in the right testis. The abscess was of long standing and was contained

within a thick fibrous coat. At the periphery of the abscess there was an inflammatory zone containing macrophages, other mononucleated inflammatory cells and numerous giant cells. The animal was not dissected further due to failing light, and was buried early the next morning by Ministry of Agriculture and Fisheries (MAF) staff before further investigations could be made. A summary of external measurements is given in Table 1.

DISCUSSION

Considering that the whale spent over a week at sea between the first and final strandings, it is especially interesting that its final stranding site was within a few hundred metres of where it was first seen in Pigeon Bay. Given the large number of possible sites for stranding on the nearby coastline, this either indicates a remarkable coincidence, or something about the bay that drew the whale back. Unfortunately it is not possible to determine whether local geomagnetic anomalies might have misled the whale into the bay (Klinowska 1986), as there is no accurate geomagnetic survey of this area. An analysis of the New Zealand stranding record and the effect of geomagnetic factors on strandings is underway by M. Brabyn (Canterbury University). So far the only published account of a New Zealand stranding for which the effect of local geomagnetic anomalies has been considered was that of 143 Pilot whales (*Globicephala melaena*) in Tryphena Harbour, on Great Barrier Island (36°19.3′S; 175°17.5′E). In Tryphena Harbour the magnetic contour lines do lead into the bay, and it is possible that geomagnetic features were a contributory factor in that stranding (Dawson *et al.* 1985).

In the case of the minke whale, it seems very likely that the animal's poor state of health was the primary cause of the stranding. Several authors have commented on an apparent coincidence between strandings and full moon (e.g., Cordes 1981, Robson 1984). Studies in progress will determine whether the correlation is significant for New Zealand strandings (M. Brabyn, pers. comm.). The first stranding (described above) coincided precisely with full moon, but the return of the whale to the same area nine days afterward suggests that the phase of the moon was not a major influence.

Table 1. External measurements (in cm). Protocol generally in accordance with Norris (1961).

Characteristic	Value
Sex	MALE
No. throat grooves between pectoral flippers	63
Length of longest throat groove	355
Girth midway anus and fluke notch	109
Height at same place	52
Thickness at same place	16
MEASUREMENTS TAKEN IN A STRAIGHT LINE PARALLEL TO BODY AXIS	
Total length (Tip of jaw to tail notch)	680
Fluke notch to umbilicus (centre)	312
Fluke notch to genital slit (centre)	228
Fluke notch to anus (centre)	170
Tip of jaw to eye (centre)	119
Tip of jaw to angle of mouth	126
Tip of jaw to ear	153
Tip of jaw to blowhole (centre)	100
Tip of jaw to flipper (anterior insertion)	189
Tip of jaw to leading edge of dorsal fin	447
Tip of jaw to dorsal fin centre	465
Tip of jaw to dorsal fin tip	482
MEASUREMENTS TAKEN FROM POINT TO POINT	
Length of eye opening	9.5
Eye (centre) to ear	30
Eye (centre) to angle of mouth	8.5
Flipper length: anterior	127
posterior	73
Maximum flipper width	28
Length of genital slit	42
Length of anal slit	14
Perineal length	24.5
Projection of lower jaw beyond upper jaw	4
Eye (centre) to blowhole edge (left)	62
Blowhole length (both)	18
Dorsal fin height	32
Length of dorsal fin base	36
Fluke width	183
Fluke depth	48
Depth of fluke notch	5.5

Throughout our observations the animal's diving pattern was irregular. It did not follow the typical cetacean pattern of several short dives followed by a longer one. The whale's diving pattern was not significantly influenced by water depth: mean dive times were not significantly different in shallow and deep areas of the harbour ($t = 1.62$; $0.10 > P > 0.05$).

While swimming, the whale was never seen to deviate from its circling behaviour. We were unable to determine whether this was due to some affliction or disability; was stress-related; or was possibly a behavioural tactic to minimise the risk of stranding. When an animal, normally found in much deeper water, finds itself in a shallow, confined harbour, swimming in tight circles may be a comparatively safe option. If the animal swims in straight lines it is likely to strand unless it can detect and avoid the shore. The direction of circling had important consequences for the rescue attempts. Pushing the whale off the rocks was only successful when the whale was pushed out so that its clockwise circling direction took it away from the shore rather than towards it.

It is possible that the circling behaviour was caused by parasitic infestation in the middle and inner ear, or brain, and for this reason it is particularly unfortunate that MAF officials buried the carcase before detailed post-mortem work was completed. Unfortunately the investigation of strandings has often been hampered by the enthusiasm of officials to bury the carcases, an action they justify on the dual grounds of public health and public relations. It is difficult to see how a delay of a few hours (or even a day) in carcase disposal constitutes a significant public health risk. If the "clean up" can be briefly postponed, biologists can gather data that will help explain each stranding event. The ability to provide such explanations would presumably have public relations benefits.

Minke whales are the most common baleen whale in the New Zealand stranding record, but it is surprising that there have been no strandings of adults. Although minke whales are not often seen in New Zealand waters, they are common in the Southern Ocean. Despite the fact that the dwarf form has been seen as far South as 53°08′S, 112°30′E, the southernmost stranding was of an animal photographed at Timaru (44°23′S; 171°15′E) (Arnold *et al.* 1987; record referred to in Gaskin 1976). The stranding reported here confirms the (at least occasional) presence of dwarf minke whales at similar latitudes.

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